SEMINAR ON OUR WORLD IN CONCRETE
SPONSORED BY READY-MIXED CONCRETE
ASSOCIATION OF SINGAPORE

SPEECH BY DR LEE CHIAW MENG,
MINISTER FOR SCIENCE AND TECHNOLOGY

25 August 1976

1 It is often said that concrete is the building material of the century. This is not surprising. Concrete is a material of unique versatility, both structurally and architecturally. At the same time, we are constructing at an even faster rate. It is suggested there are more constructions completed during the last quarter of the century than the entire previous human history.

2 Although it is difficult to estimate the total amount of concrete used for construction, it has been estimated that the world consumption of cement exceeds 160 million metric tonnes per annum, and it is expected to reach 200 million metric tonnes by 1980. In Singapore alone we consume more than one million metric tonne of cement annually. Although there is no data on the amount of concrete used, it can be calculated that the upper limit would be around 7-8 million metric tonnes of concrete cast per year with a total value of between $350m and $400m. This is a staggering figure considering that we have only two million people. It works out each Singaporean uses 20 times our own weight of concrete per year. With such a vast quantity of concrete used perhaps we may ask ourselves - Are we getting the best that technology can offer?.

3 Concrete technology has come a long way since the introduction of Portland cement in 1800. Concrete products can now be cast to a high degree of accuracy not dreamt of before. There are great advancements in admixture, in the techniques of material handling, in the control of the curing mechanism and in construction techniques and equipment. There is practically a type of concrete for every conceivable environment and use.

4 How do we fare in Singapore? When I first joined the engineering profession 17 years ago, pre-mix concrete had just been introduced; slipform was unheard of. Fleets of pre-mix concrete trucks are now common sight on our roads, many latest handling techniques have been introduced. Beyond this, at a glance, one gets the impression that concrete construction technology has not progressed much over the last two decades. Concrete is still being mixed and handled by untrained and unskilled personnel. Form-work was erected in such a way that very often remedial measures were necessary. Then there is the perennial complaint of the poor workmanship of structural concrete to the extent that water can leak through a concrete beam. The use of such parameters as water-cement ratio and workability confines more to theory than in practice.

5 One area where there is a perceivable lack of progress is in the pre-cast, pre-fab technique for building construction. Considering the large number of housing units we are building every year, the constraint of land space available for site work, the need to import construction workers, it appears obvious that we must go for high technology, less labour intensive technique which can operate within a confined space. The government,

on its part, has tried to encourage the adaptation and development of such technique. For example, the Housing and Development Board had given preference and assistance to contractors who adopted such technique which requires higher technology employing less, but higher skilled, workers and faster construction rate. There have been a few previous attempts in these. Unfortunately, none of them has been successful.

6 There is no doubt our engineers are competent to keep abreast with the latest construction techniques. Why then we have not been successful in this particular area? We are fairly good at other pre-cast concrete products, for example, spurn concrete pipes, and pre-stressed beams, etc. For those who look for scapegoat, it will be easy to lay the blame on lack of interest, conservatism, resistance to changes, or just poor site management. I confess I do not know the answer. Perhaps this is one area the engineers in Singapore and the professional institutions should look into, especially this is an area where it has a lot of potentials for development.

/4

7 Although it is obvious we cannot afford to have an organisation comparable to the Cement and Concrete Association, many of its activities are worth pursuing. Perhaps a sub-group can be formed within the Institution of Engineers Singapore, or alternatively, we can designate the engineering faculty of the University to carry out such activities, in particular, those relating to data collection and information dissemination.

8. Some of the areas which we could address ourselves to are:-

1) How to ensure better quality control in the concrete industry, particularly construction industry and

2) How best to adapt more advanced technology to overcome the various constraints we face.

9 It is necessary to strive constantly to do better if we wish to provide better service to the users and to improve our position as a regional centre for technical services. And for the concrete industry, the final aim must be to give the client the concrete he wants. To achieve that, we cannot continue to rely on unskilled workers and old-fashioned technique and machineries.